

Left Side Of Poster:

(Top Of Poster With Orange Background): Conducted By Joseph Puccio

(Second On Left With Yellow Background) Purpose:

The purpose of this lab is to discover the differences each of these following three elements have on an environment, including any change in temperature, affects on the plant and creature life, and any affects on the environment as a whole:

- Carbon Dioxide
 - Water Vapor
 - Methane
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(Third On Left With Red Background) Hypothesis:

I hypothesize that when inserting Carbon Dioxide the plant life will remain the same if not thrive, the heat may increase slightly, and animal life will not be affected dramatically. I hypothesize that when inserting Water Vapor into the closed environment, the temperature will remain the same if not decrease due to reflected sunlight off of the vapor, I hypothesize that the plants and animals will not be affected very much. I hypothesize that the Methane will decrease the plants growth if not kill them along with the animals, I hypothesize that the temperature will increase slightly.

(Forth On Left With Green Background) Procedure:

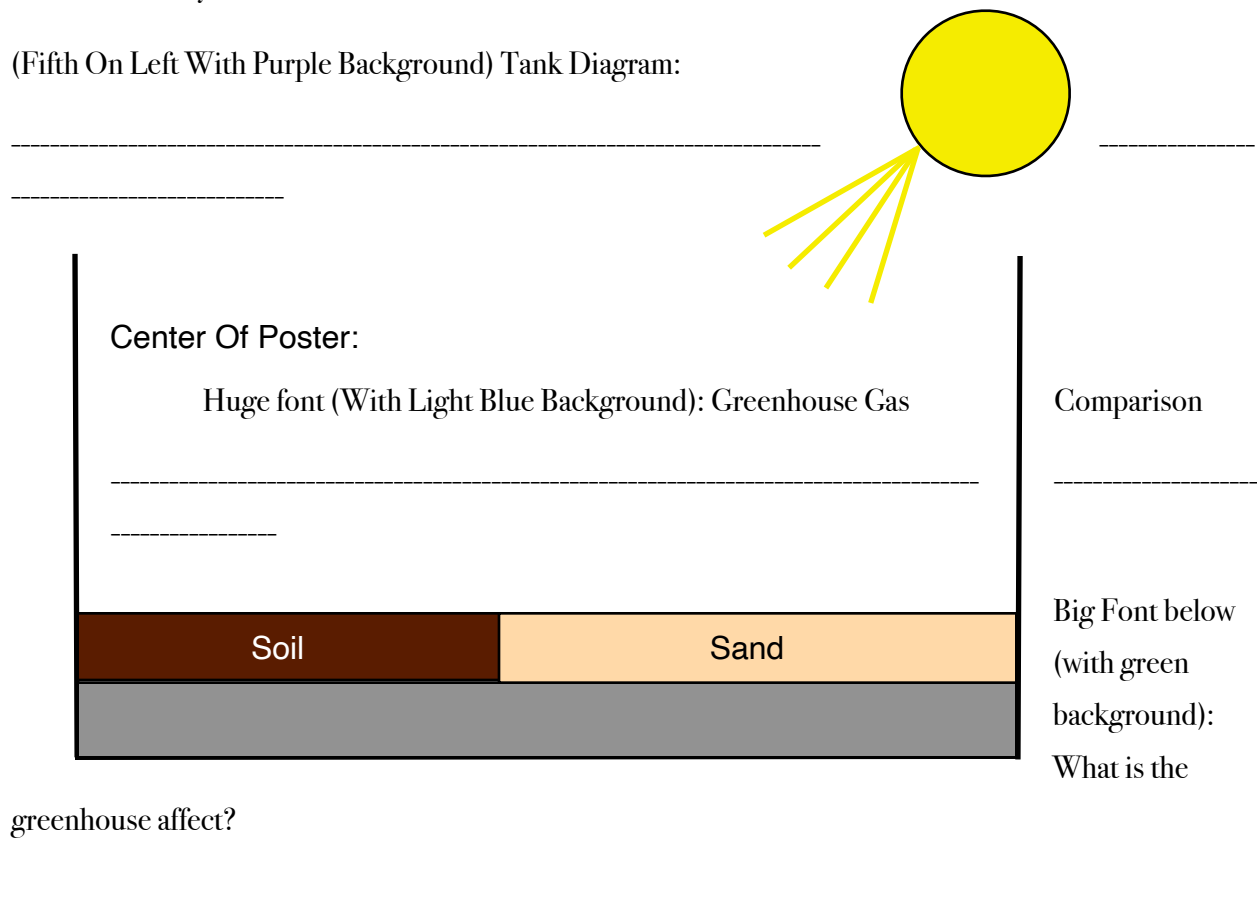
Step 1:

I started my experiment by recreating an enclosed environment in a ten gallon fish tank. I first created the lower layer, which consisted of clay, soil, and sand. I then planted 5 plants within the soil, and tapped two thermometers on the inside of the tank, one above the sand, and the other under the soil. Then I placed a lamp above the tank to represent the sun. I recorded the temperature of both the thermometers into a data table, this was so I could find the average temperature within the tank when there were no other gasses.

Step 2:

After creating my environment I introduced two different greenhouse gasses on separate trials. These being Water Vapor, and Carbon Dioxide. I also preformed a trail without any greenhouse gases to make the comparison easier. I measured the ground and atmosphere temperature of the tank for an hour, and recorded my results in a data table.

(Fifth On Left With Purple Background) Tank Diagram:



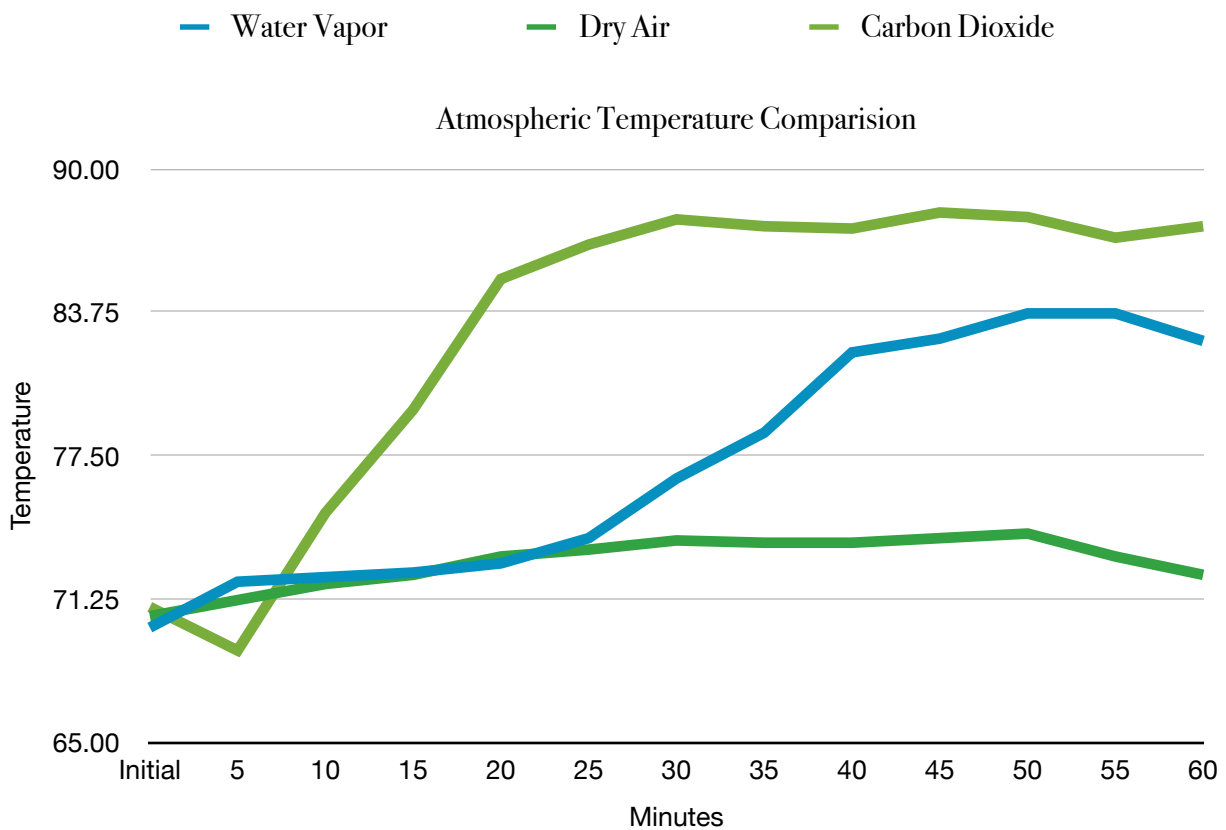
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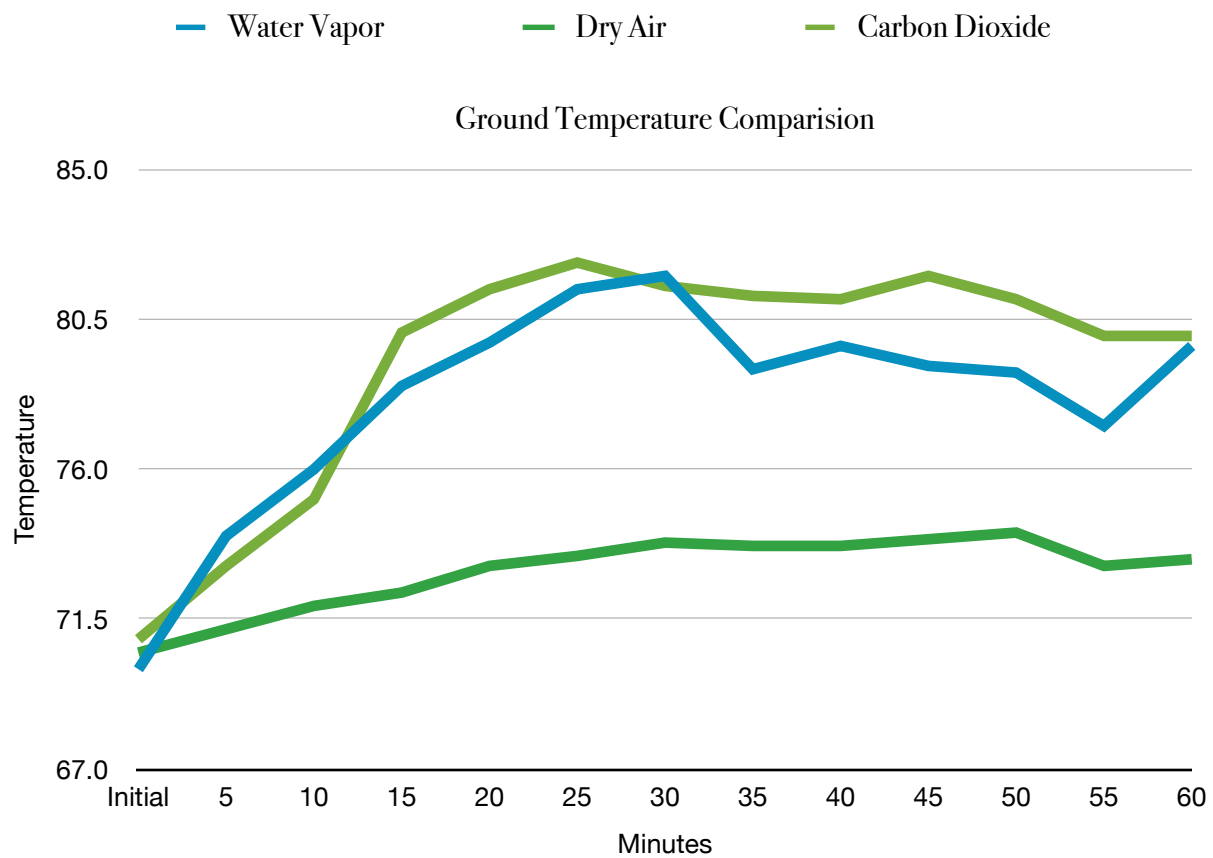
When the sun's light reaches our planet the most harmful radiation is reflected by the atmosphere, while the rest makes its way through our atmosphere to the Earth's surface, which either reflects off of the surface or is absorbed by the Earth. The Earth then releases a portion of it, in the form of infrared radiation, resulting with some of the radiation being trapped heating the Earth, and the rest radiating back into space.

Now the trapping of some of the infrared radiation is essential to our survival, without this effect our Earth would be cold to the point where we could no longer inhabit it. However, an increase in greenhouse gases such as Carbon Dioxide, Water Vapor, and Methane will result in more of the infrared radiation being trapped thus warming the climate to a larger extent.

(With dark blue background, big font): Data

Below that with dark blue background on two separate sheets):







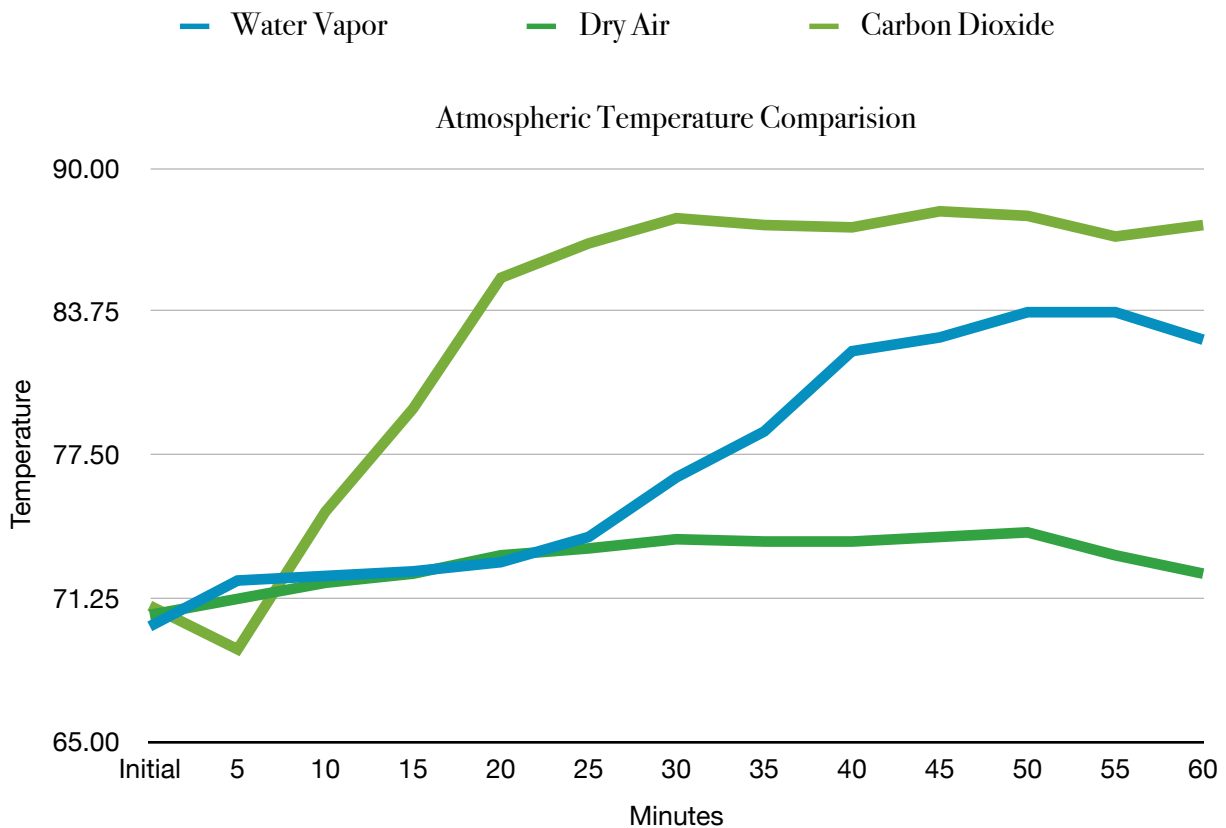
Conclusion:

After passionately researching each of these alternative sources of energy, I found solar power to be the most efficient. However, I find the most realistic to be nuclear power. The reason I find solar power to be the most efficient is because not only is it very cheap to use after installation, it uses a source that will last for millions if not billions of years. The reason I find nuclear power to be the most realistic is because it currently accounts for over 20% of the world's electricity. Uranium is becoming very plentiful in the 21st century, and it does not emit any carbon dioxide into the atmosphere.

In this lab I recorded atmospheric temperature as well as the ground temperature of an enclosed environment when introducing different greenhouse gases. I began by constructing the most realistic environment possible. I then turned on the lamp, which was representing the sun in this recreation, and

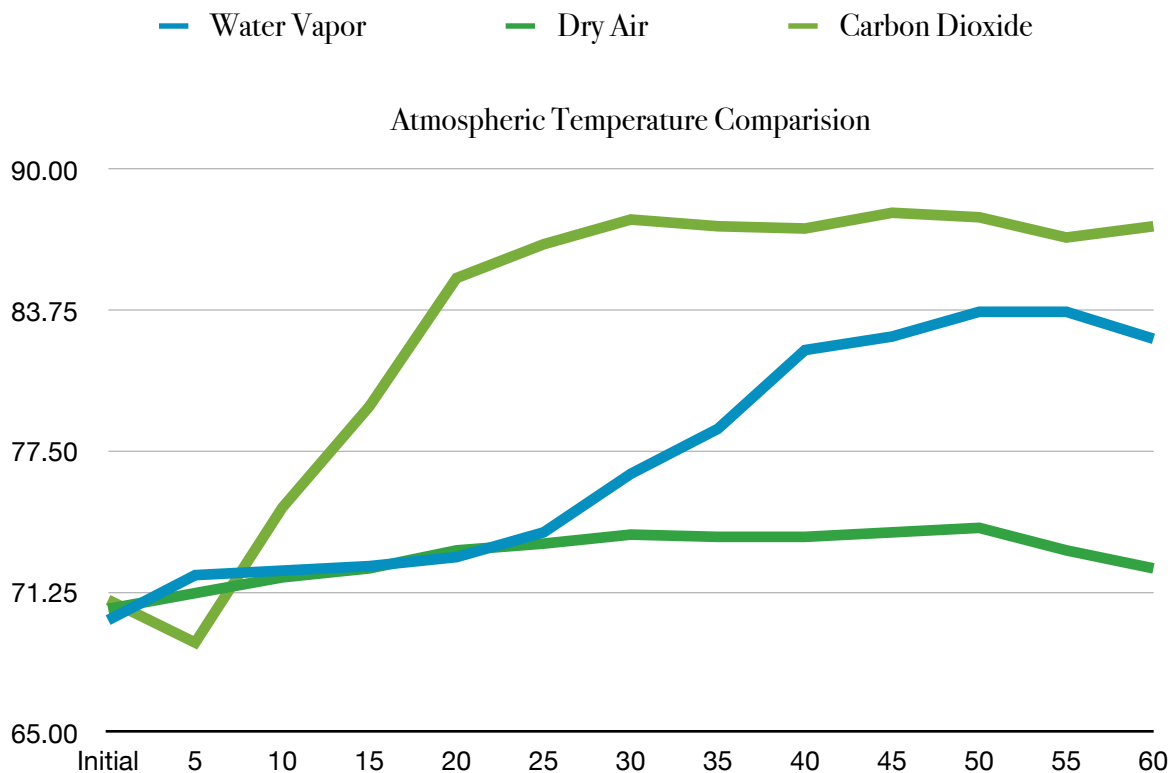
recorded to temperature every minute for five minutes. This was so that I could record how warm the tank would be normally with the lamp on.

Next I added water into the tank and spread out with tinfoil allowing a larger surface area, a larger surface area allows more of the water to become vapor. As I have noted earlier water vapor is a greenhouse gas, meaning that it should theoretically increase the temperature of the atmosphere, in order to better understand my data I plotted a graph:



Based on this graph it appears that I have successfully demonstrated the affect of water vapor on an environment. I did this by comparing the green line (normal dry air) with the blue line (water vapor), and at no point in this test was the temperature of the tank with normal dry air higher than it was with water vapor in it. This indicated that the water vapor had an affect on the temperature of the tank, supporting my hypothesis, as well as the fact that water vapor is a greenhouse gas.

After recording my results and observations I continued onto the next step of my procedure, which was to replace the water with dry ice. I did this because the dry ice volatilizes into carbon dioxide, which is also a greenhouse gas and is likely the most known about. This gas as well as the water vapor should theoretically increase the temperature of the tank. In order to better understand my data I plotted a graph that compares all the three gasses I tested with.



This graph indicates that there was an increase of temperature within the environment. Something that is certainly worth noting is that there was a significant difference between the Carbon Dioxide trial and Water Vapor trial. This indicates that carbon dioxide could have more of an effect on an atmosphere than water vapor. This also supports my hypothesis, but may be a fairly new observation regarding the difference of temperatures conducted by previous studies

Background Research (with purple background):

Environmental organizations and leaders really became strong in the sixty's and seventy's, which were mainly sparked by the set of problems that were found in Los Angeles, California. These problems mainly being smog, which is basically fog combined with smoke and other atmospheric pollutants, and acid rain. These two problems were dealt with very effectively, by affixing catalytic converters to the tail pipes of cars to solve the smog problem, and scrubbers to be affixed to smoke stacks.

According to Michael Shellenberger author of "Break Through" a book about market oriented environmental solutions "Global Warming is a very different challenge, you can't stay with coal and oil as your fundamental energy source." He later goes on to say that the United States as a whole has to reduce it's emissions somewhere around 80% by 2050, and somewhere around 50% worldwide. And that there is no easy inexpensive technical solution, and it requires an acceleration of our transition to clean energy sources.

In other words it requires new sources not less of an old source. In an interview with the New York Times Michael Shellenberger also states "There is very good research showing that in the last 30 years, every time you double the production of solar panels the cost comes down about 20%, and experts are saying that if we invest between 50-200 billion dollars you could bring down the cost of solar to natural gas and coal." This is a solution that comes from a technology innovation, and not from pollution regulation.

Activities:

Give Little Kids Paper and different colors so that they can create their own greenhouse affect, give them my science notebook to copy off of.

Materials Needed:

1 White Poster

2 Light Blue Pieces of paper

4 Dark Blue Pieces of paper

3 Purple Pieces of paper

3 Green pieces of paper

5 Orange pieces of paper

2 yellow pieces of paper

3 red pieces of paper